

# Disease Detection and Risk Communication in the Digital Age

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## **At the end of this presentation, the attendee will be able to:**

- Explain modern-day techniques used in digital disease detection through non-traditional forms of surveillance.
- Define risk communication and compare different approaches aimed at effectively communicating health risks to a variety of populations.
- Discuss the important role of news media in risk communication and digital disease detection.

One Health  
Health Journalists  
Emerging Infectious Diseases  
Epidemiology  
Global Health  
Capacity Building  
Nepal Program Evaluation  
Event Reporting  
Research

# Connecting Disease Detection and Risk Communication



World Health Organization



# Public Health Surveillance

The ongoing systematic collection, analysis and interpretation of health data essential to the planning, implementation and evaluation of public health practice, closely integrated with timely dissemination of these data to those who need to know. The final link in the surveillance chain is the application of these data to prevention and control. A surveillance system includes a functional capacity for data collection, analysis and dissemination linked to public health programs.

Centers for Disease Control and Prevention

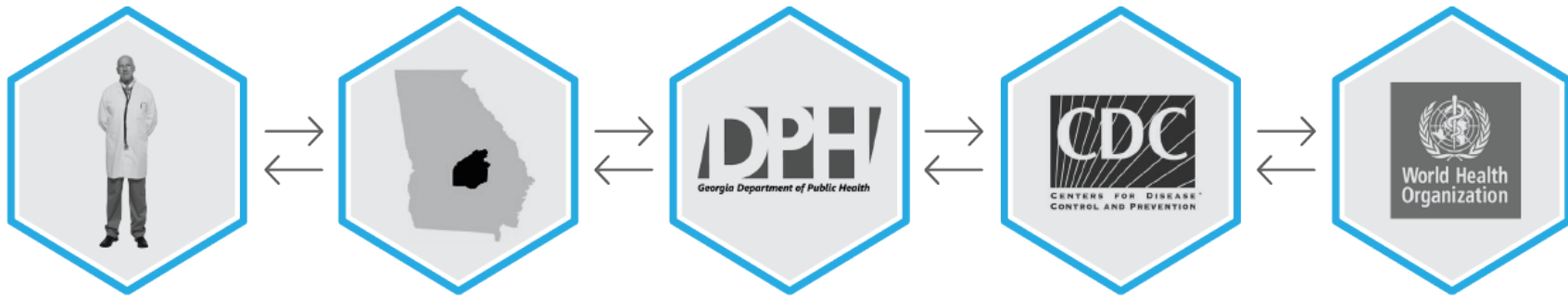
**SURVEILLANCE**  
**IS INFORMATION THAT**  
**DEMANDS ACTION!**

# Objectives of Surveillance

1. To describe the ongoing pattern of disease occurrence and to link with public health action.
2. To study the natural history and epidemiology of the disease.
3. To provide information and baseline data which can be used to assess prevention and control measures.

# Traditional Surveillance Information Cycle

## Individual Reporting



## Aggregate Feedback

Centers for Disease Control and Prevention

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# Non-Traditional Forms of Surveillance



# Traditional Surveillance

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Lack of infrastructure

Gaps in coverage

Poor information flow

Dependent on coding and  
physicians

Limited to notifiable diseases and  
varies by state

# Web Surveillance

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Abundant cheap/free resource



Detailed local information

Near real-time reporting

Less susceptible to political  
pressure

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- 12 Jul 2016 Rabies, animal, human (DS): Asia, Europe, updates

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Published Date: 2016-07-14 12:08:05  
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 Archive Number: 20160714.4244647

**PLAGUE - RUSSIA: (ALTAI) BUBONIC**  
 \*\*\*\*\*  
 A ProMED-mail post  
<http://www.promedmail.org>  
 ProMED-mail is a program of the  
 International Society for Infectious Diseases  
<http://www.isid.org>

Date: Wed 13 Jul 2016 12:02 UTC+3  
 Source: TASS Russian News Agency [edited]  
<http://tass.ru/en/world/987668>

The notorious bubonic plague, one of the world's most dangerous infectious diseases, which killed 1/3 of Europe's population in the Middle Ages has infected a Siberian youngster. A 10-year old boy in Siberia's Altai Republic has contracted bubonic plague, local medics told TASS on Wed [13 Jul 2016].

"The boy was hospitalized yesterday [12 Jul 2016] with a high fever and tested positive for bubonic plague. He is in a serious condition," doctors said. All the 17 people, including 6 children, with whom the boy had contact, have been quarantined. The boy is believed to have picked up the disease during a hiking trip to the mountains, where groundhogs (see below - Mod.LL) have been found to be plague carriers, medics explained.

According to the WHO, more than 13 000 people contracted bubonic plague in Asia, Africa, and America between 2004 and 2013. Roughly 900 of them died from the disease.

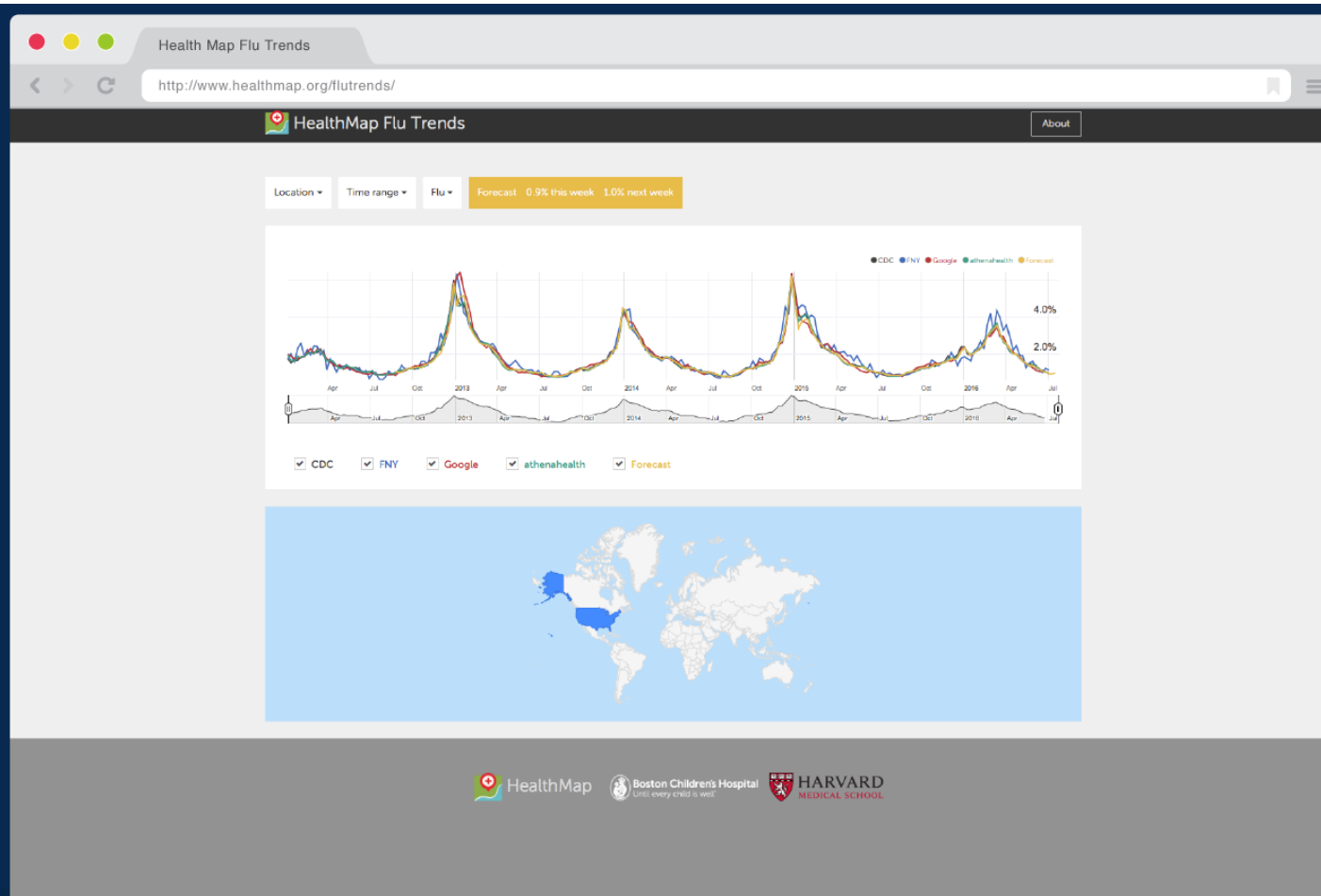
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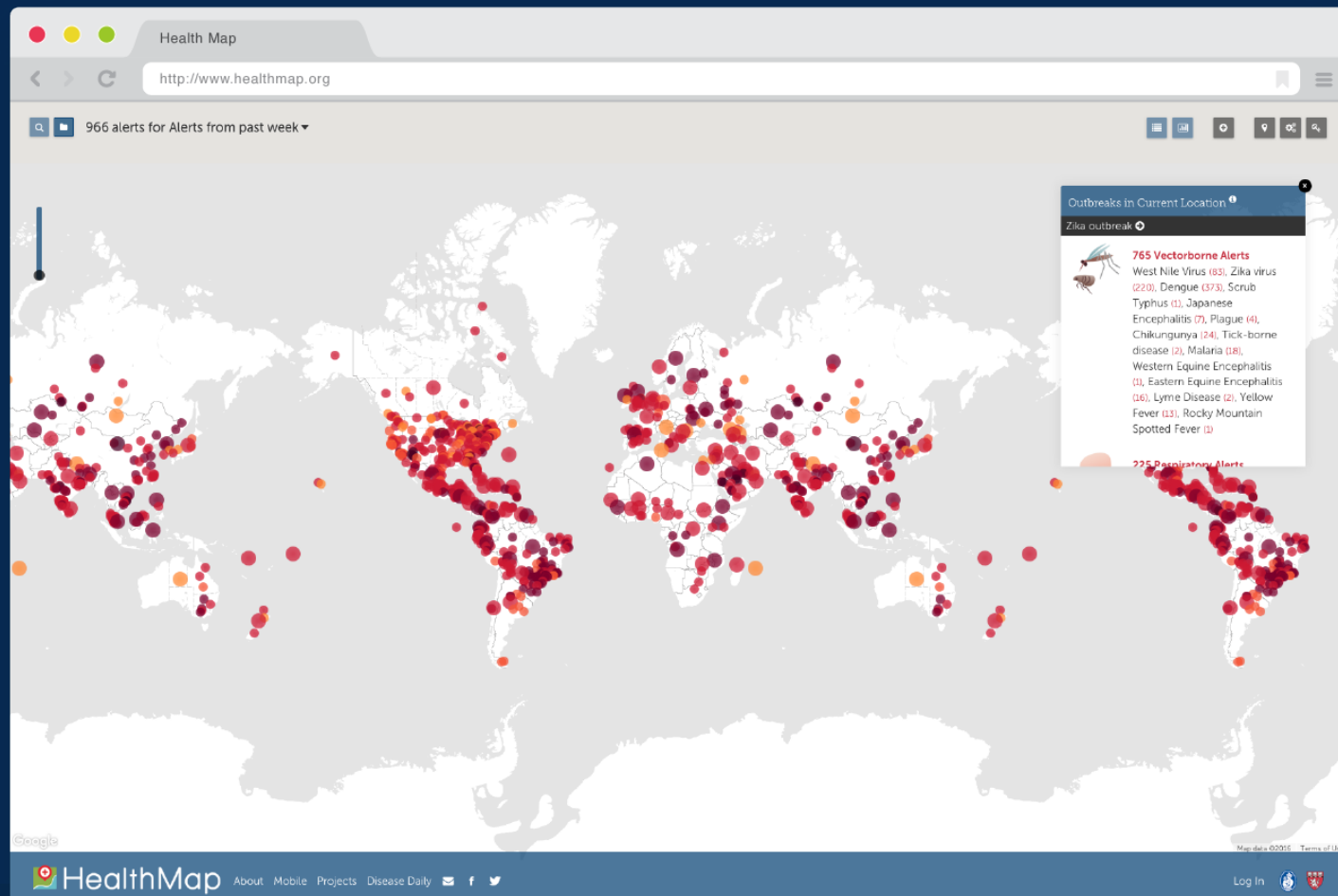
[The reservoir of plague in the this area of the world is primarily the marmot (probably Siberian marmot, *Marmota sibirica*). They are hunted for their fur, and hunters get bitten by their infected fleas, or infected from their blood when skinning them. For a photo, see <http://tinyurl.com/qmivmcl>. Humans are infected from the animal reservoir by being fed upon by the mammal's infested fleas or from direct contact with an infected animal.

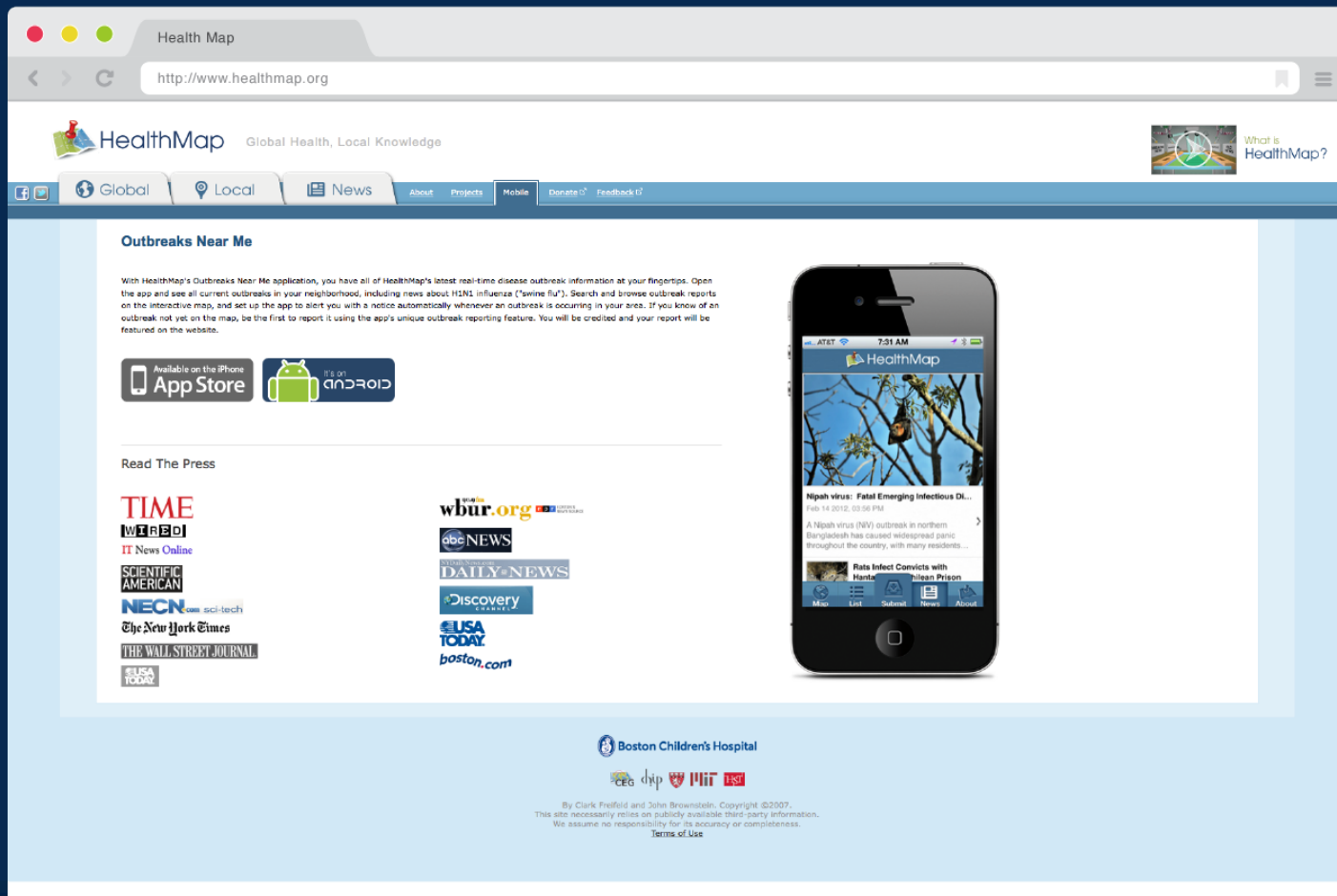
In North America, groundhog (or woodchuck), *Marmota monax*, is found through most of the eastern and central USA and then its range extends into northwest Canada (see range at [http://naturalhistory.si.edu/media/tumbler/maps/Marm\\_monax.gif](http://naturalhistory.si.edu/media/tumbler/maps/Marm_monax.gif)). Unlike the Siberian marmot, the North American woodchuck appears to be rarely if ever associated with plague or its transmission to humans probably because the range does not overlap much with the endemic areas for *Yersinia pestis*, in North America.

Plague only transmits from person-to-person by the respiratory route, which occurs from bacteremia spread of the organism to the lung from the bubo (secondary pneumonic plague) or when the organism is acquired from inhalation (primary pneumonic plague).





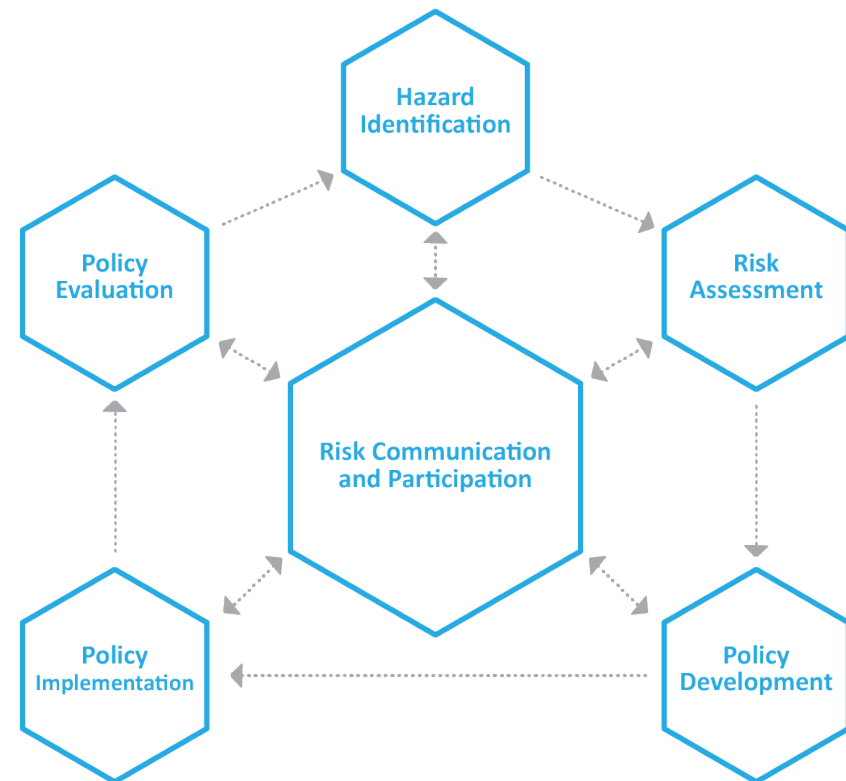




**SURVEILLANCE**  
**IS INFORMATION THAT**  
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# Risk Communication

Any purposeful exchange of information about risks between interested parties.



World Health Organization

# Risk Communication Functions

Enlightenment  
Right-to-know  
Attitude modification  
Legitimate function  
Risk reduction  
Behavior change  
Emergency readiness  
Public involvement  
Participation

World Health Organization

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# Communication Partners



Consumer  
or Patient



Media



Scientific  
World

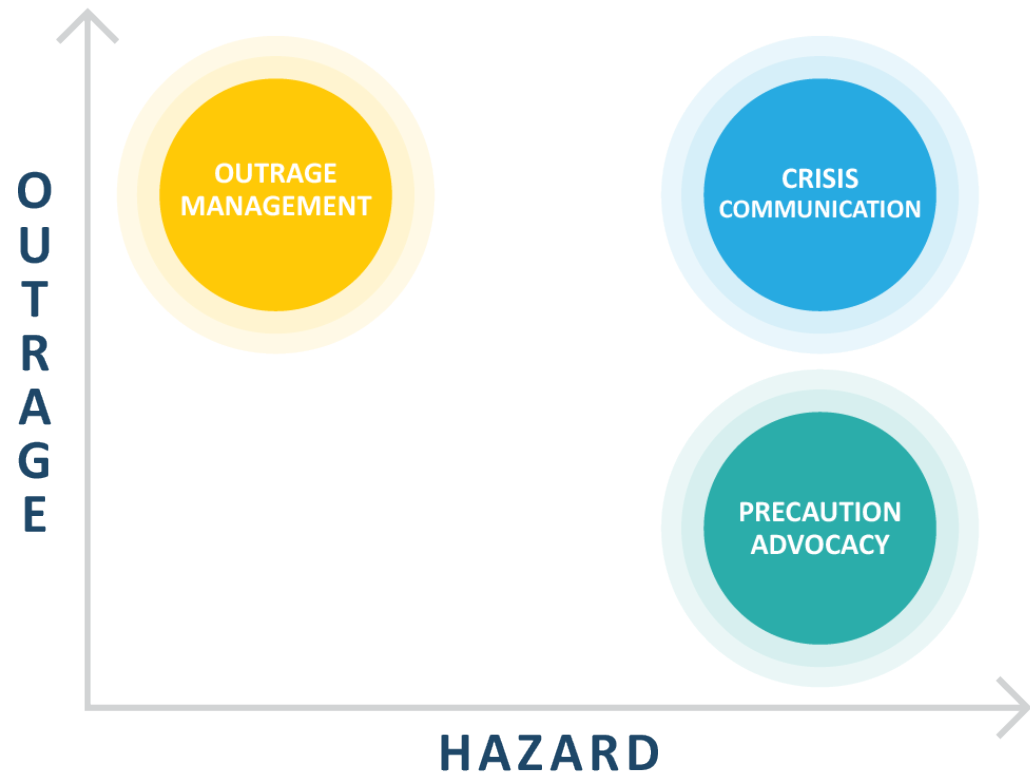


Legislation



Industry

**Hazard  
+  
Outrage  
=  
Risk**



Peter Sandman

# Constraints to Effective Risk Communication



## Communicator

Organizational Constraints  
Emotional Constraints



## Audience

Emotional Constraints  
Hostility and Outrage  
Mistrust of Risk Assessment  
? of Acceptable Risk  
Lack of Faith  
Learning Difficulties

Stigma  
Stability of the Knowledge Base

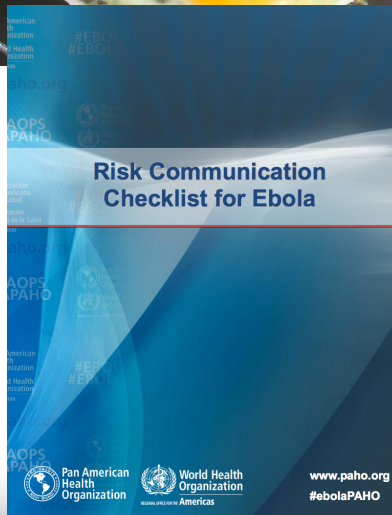
Risk Communication. Lundgreen & McMakin.



# Risk Communication in the Digital Age



# Risk Communication Examples



CDC'S RESPONSE TO ZIKA  
**WHAT WE KNOW**

AND WHAT WE DON'T KNOW.

**What we know**

-   
Zika can be passed from a pregnant woman to her fetus.
-   
Infection during pregnancy can cause certain birth defects.
-   
Zika is spread mostly by the bite of an infected Aedes species mosquito.  
These mosquitoes are aggressive daytime biters. They can also bite at night.
-   
Zika is not currently found in the continental US. The mosquitoes that can carry Zika are found in some areas of the US.
-   
Because the mosquitoes that spread Zika virus are found throughout the tropics, outbreaks will likely continue.
-   
There is no vaccine or medicine for Zika.



**GET A KIT  
MAKE A PLAN  
BE PREPARED**

infect 

thetruth.com

# Role of the News Media in Risk Communication

- The media is critical to the delivery of risk information to the general public.
- The media tends to be highly selective when reporting risk.
- Source selection, tight deadlines, selective coverage, and lack of expertise on topics complicate the process.

Truth in Journalism ≠ Truth in Science

**TORONTO STAR**  
 WEATHER HIGH -11 C | PARTLY SUNNY | MAP S12  
 THURSDAY, FEBRUARY 5, 2015  
 > STAR INVESTIGATION

## A wonder drug's dark side

Hundreds of thousands of teen girls in Canada have safely taken Gardasil, a vaccine shown to prevent HPV. But a Star investigation has found that since 2008, at least 60 Canadians experienced debilitating illnesses after inoculation. Patients and parents say the incidents point to the importance of full disclosure of risks

**DAVID BRUSER AND JESSE MCLEAN**  
 their agencies

By the time Kaitlyn Armstrong received her third and final injection of the popular HPV vaccine Gardasil, pain had spread through the Whitey teeth body, migrating from her back to her knees to her hips. After her first dose, Natalie Kenna of London developed size lumps on the sole of her foot, her joints swelled and her limbs twitched uncontrollably. Before getting the shots, both 18-year-old girls were told the vaccine had no significant risks. And as they struggled to learn what ailed them, and began to believe Gardasil played a role, doctors dismissed their concerns.

Hundreds of thousands of teenage girls in Canada have received the vaccine's three doses, the vast majority without incident. Regulators, including Health Canada and the FDA in the United States, cite comprehensive clinical trials and other data that show the vaccine's well-studied safety and efficacy. But since 2008 at least 60 girls and women in Canada have complained of developed disabling joint and muscle pain and other debilitating conditions after receiving Gardasil.

One needed a wheelchair, another a feeding tube. A 14-year-old Quebec girl, Annabelle Martin, died two weeks after receiving the second injection of the vaccine.

It was 7:30 p.m. on the night of Dec. 9, 2008, when her mother, Linda, found her in the tub, her head underwater and turned to her side.

The paramedics lifted Annabelle's body on to a stretcher. "I put a blanket on her, saying 'She's going to breathe,'" Linda recalled. "I did not know she was already dead."

The Quebec coroner's office said the cause of death was drowning, yet also said that any role Gardasil might have played should be further investigated.

In the cases discussed in this article, it is the opinion of a patient or doctor that a particular drug has caused a side effect.

There is no conclusive evidence showing the vaccine caused a death or illness.

Like Kenna and Armstrong, many of the girls say the vaccine was pushed on them by school officials, nurses or doctors who understated the risks, sometimes claiming zero significant side effects despite the existence of a list of rare but serious vaccine-related reactions published by the drug's maker.

The Star has found the girls' concerns are not isolated, that in Canada important safety information about the vaccine has not been communicated to many young patients and their parents.

As part of its ongoing investigation into drug safety, the newspaper analyzed side-effect reports from a Health Canada database, and interviewed regulators, a doctor closely involved in the vaccine's clinical trial and, in 12 cases, young women and parents who believe the vaccine caused considerable suffering.

Some of the girls have, after several years, made partial recoveries and are trying to live normal lives. Others are still bouncing from doctor to doctor, looking for answers.

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**WHAT IS GARDASIL?**

A vaccine delivered in a series of shots. The \$420-\$500 cost paid by provinces. Public health nurses administer the inoculations in schools.

Approved in more than 130 countries, the vaccine protects against strains of human papillomavirus (HPV) that cause 75 per cent of cervical cancer cases. Roughly 400 Canadian women die of cervical cancer each year.

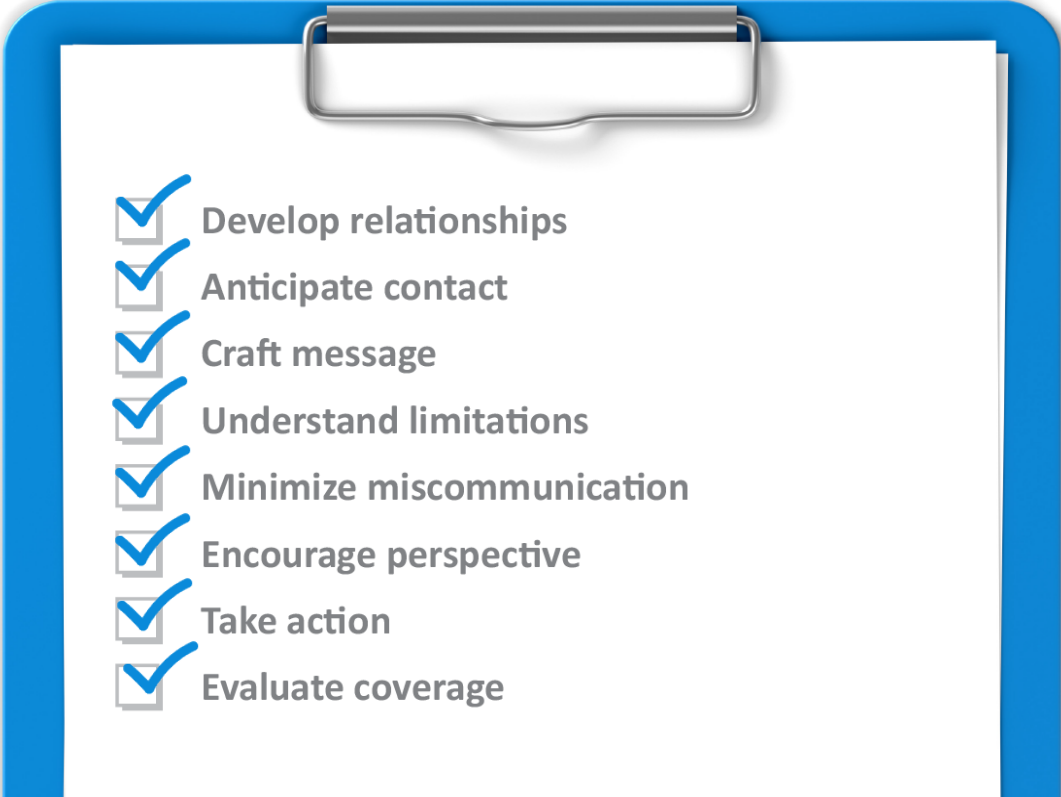
**GARDASIL, continued on A10**



Kaitlyn Armstrong says the nurses giving her the HPV vaccine Gardasil ignored her when she said she was allergic to metal.

ARMSTRONG/TORONTO STAR

# Working with the Media

- 
- ☒ Develop relationships
  - ☒ Anticipate contact
  - ☒ Craft message
  - ☒ Understand limitations
  - ☒ Minimize miscommunication
  - ☒ Encourage perspective
  - ☒ Take action
  - ☒ Evaluate coverage



# Merging Global and Local Information Systems

- There are still areas of limited internet connectivity.
- Sometimes disease events are only highlighted in local broadcasts or recorded in local print media.
- Accessing and translating this local information for inclusion in global disease surveillance databases would be an important step in the establishment of an early warning system.



**Bolivia**



**Nepal**

# Thank you

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